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A. V. HATFIELD

**SCHOOL BUILDINGS,
FURNITURE AND
PLAYING FIELDS**



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SCHOOL BUILDINGS, FURNITURE
AND PLAYING FIELDS





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SCHOOL BUILDINGS, FURNITURE AND PLAYING FIELDS

A book about land for schools,
the sizes of school rooms, and the kinds of
furniture and fittings there should be

by

A. V. HATFIELD, B.A. HONS.
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Coast Province, Kenya*

Illustrated by George Woodman



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§ 1. INTRODUCTION

This little book has been written to help those who are planning to build a school, and those who wish to improve an existing school or make it bigger. Although it is intended mainly to help those who are concerned with primary and middle or intermediate schools, namely, schools for the first seven or eight years of school life, it will also be found helpful by those who are concerned with secondary schools.

Some countries, districts and towns have made rules to guide and control the building of schools and these should be obtained and carefully followed.

In many parts of the world, however, especially in the country areas, few such rules have been laid down, perhaps none, and expert advice is hard to get. It is in these parts that this book will be found most helpful.

This book gives an idea of how much land a school should have, how the school buildings and playing fields should be placed, how big a classroom should be, or a dormitory or a school hall, how big the desks should be and so forth.

The Author would like to thank the Kenya Education Department for allowing him to draw freely from information contained in departmental circulars.

PART I

THE LAND

§ 2. CHOOSING THE LAND

Nearness to the children's homes

The land for a school should be close to the homes of the children so that they can get there easily and quickly and go home for lunch. This is especially important with schools for small children. If the school is too far away, much time is wasted going to and from school, the journey is tiring if the children have to walk, and costly if they go by bicycle or by bus.

Access

It should be possible to get to the school in all weathers. There should be a road to the school along which motor-cars or lorries can travel, so that supplies can be brought in easily and quickly, and important visitors can get there quickly from far away.

Level land

Flat, level land is best for four reasons:

- (a) Flat, level land is needed for playing fields.
- (b) It is cheaper to build on level land.
- (c) It is easier to put the buildings and playing fields in the best places.

- (d) There is less trouble from rainwater washing away the paths.

Good soil

If the soil is good, so much the better, for it is best if the playing fields can be covered with soft grass and shady trees can be grown. If the soil is good, it is easier to teach the children gardening. It is easier to grow shrubs and flowers to make the school grounds look more beautiful. And it is easier to grow a hedge along the boundaries.

Drainage

The land should be well drained so that it does not get waterlogged in wet weather.

The shape of the school plot

Rectangular shaped land is usually the best. This is because school buildings and playing pitches are usually rectangular in shape and fit more easily into a plot of land with straight sides at right angles to one another than into a plot of irregular shape.

Water supply

There should be a good, permanent supply of water so that the children can always get water to drink and to wash themselves with. Water is also needed for watering plants in the dry season and for building.

§3. THE AMOUNT OF LAND NEEDED FOR A SCHOOL

When deciding how much land the school should have, the following points should be borne in mind.

1. Useless land

Except in places where sufficient level land is unobtainable, it is best to disregard rocky, broken, or steeply sloping land, for it is very difficult and costly to make such land level enough for playing fields or buildings. In addition, soil erosion may cause great trouble.

2. Sufficient land for games

There should be enough flat land for playing fields to enable each child to play some kind of game twice a week. This means that *there should be enough games pitches to enable two-fifths (40 per cent) of the children to be on the grounds playing games every day.*

3. Resting the land

In dry countries, where playing fields can be spoilt by being used too much, it is best to have spare land so that overworked playing fields can be rested and the grass given a chance to grow over the bare patches.

4. Land for staff houses

In day schools, it is a good thing if the land is big enough to enable the Principal to have a house on it so that he can keep an eye on the school after

school hours and during the school holidays. Thought should also be given to whether any land on the school plot may be needed for teachers' houses or servants' quarters, either at present or in the future. It must always be remembered, however, that in the case of day schools, it is more important to have plenty of playing fields for the children than that staff houses should be on the compound. If there is a shortage of playing field space, the staff can live elsewhere.

In boarding schools there should be enough land for the houses of all those members of staff whose duties include looking after the boarders.

5. Land for agriculture

For schools which teach gardening, or agriculture, or animal husbandry, much more land is required than for schools which do not. The same is true of boarding schools which grow some of their own food.

6. The number of children to be educated

The amount of land needed for a school, whether a primary school or a secondary school, depends on the number of children who will go there. The land should be big enough for a school to take all the children in the area who have no other school to go to, even if it is known that many of the people either cannot afford to send all their children to school or do not wish to. The reason for this is that, in ten or twenty years' time, it may be the custom for everyone to send his children to school.

It is important, when working out the number of children who may go to a school intended for both boys and girls, to count all the girls as well as all the boys. In some parts, it is not the custom to send all the girls to school, but in ten or twenty years' time it may become the custom and the amount of land set aside for the school should allow for this.

7. Preparing for more children in the future

It is very important to remember that the number of people living in an area may double itself in thirty years' time, so that there will be twice as many children in the future as there are now. The fact that the number of children in the area is likely to increase in the future should be allowed for, and more land set aside for the school than seems necessary at present. In many parts of the world, it would be wise to set aside twice as much land for the school as would be needed for all the children at present alive in the area.

It is always wise to get much more land for a school than is needed immediately. Sufficient land for schools will probably be very much harder to get in the future and it will probably be much more expensive. Indeed, it may not be obtainable at all. On the other hand, if the future proves that a school has more land than it needs, the extra land can very easily be given up for some other purpose—perhaps very profitably for the school. Some schools plant trees on their spare land for sale later to help pay for new buildings. This is a very good idea.

§ 4. LAND FOR SCHOOLS IN TOWNS AND TOWNSHIPS

A good way to get an idea of how much land to set aside for a school is to go by the total number of people, men, women and children, in the area it will serve. This method was used by the Kenya Education Department in 1947 when it recommended that *in township areas* suitable flat, level land should be reserved for African schools as follows. These figures will serve as a useful guide for any race in any country.

Nursery schools

For each group of 1600 people, one nursery school, on one acre of land, for 80 children.

Day primary schools

For each group of 3200 people, $7\frac{1}{2}$ acres for a primary school for 480 pupils. This does not allow for the housing of teachers.

Day secondary schools

For each group of 6400 people, 12 acres for secondary education for 600 pupils.

Another way to work out the amount of land needed is to go by the number of classes it is intended to have. In 1959 the Kenya Education Department used this method in working out the

following tables showing the minimum land considered necessary for schools in townships.

DAY PRIMARY SCHOOLS

| <i>Streams</i> | <i>Classes and pupils</i> | <i>Total pupils</i> | <i>Acres needed</i> | | |
|----------------|-----------------------------------|-------------------------|--|---------------------------|------------------------|
| | | | <i>Playgrounds and buildings</i> | <i>Playing fields</i> | <i>Total acres</i> |
| 1 | 7 × 40 | 280 | 1½ | 1½ | 3 |
| | 8 × 40 | 320 | 1½ | 1½ | 3 |
| 2 | 14 × 40 | 560 | 2 | 2½ | 4½ |
| | 16 × 40 | 640 | 2½ | 2½ | 5 |
| 3 | 21 × 40 | 840 | 2½ | 3½ | 6 |
| | 24 × 40 | 960 | 3 | 4 | 7 |

DAY SECONDARY SCHOOLS

| <i>Streams</i> | <i>Classes and pupils</i> | <i>Total pupils</i> | <i>Acres needed</i> | | |
|----------------|-----------------------------------|-------------------------|--|---------------------------|------------------------|
| | | | <i>Playgrounds and buildings</i> | <i>Playing fields</i> | <i>Total acres</i> |
| 2 | 8 × 30 | 240 | 1½ | 6 | 7½ |
| | 8 × 35 | 280 | 2 | 7 | 9 |
| 3 | 12 × 30 | 360 | 2½ | 7½ | 10 |
| | 12 × 35 | 420 | 3 | 8½ | 11½ |
| 4 | 16 × 30 | 480 | 3 | 9 | 12 |
| | 16 × 35 | 560 | 3½ | 10 | 13½ |
| 5 | 20 × 35 | 700 | 4 | 11 | 15 |
| 6 | 24 × 35 | 840 | 5 | 13 | 18 |

SECONDARY BOARDING SCHOOLS IN TOWNSHIPS

The following areas are the minimum for a three stream school (360 to 420 pupils).

| | <i>Acres</i> |
|------------------------------------|-----------------------------------|
| School buildings | 3 |
| Dormitories | 2 |
| Kitchens and dining-rooms | $\frac{1}{2}$ |
| Staff housing | 8 |
| Dispensary | $\frac{1}{2}$ |
| Quarters for three school servants | $1\frac{1}{2}$ |
| Church | $\frac{1}{2}$ |
| Assembly hall | $\frac{1}{2}$ |
| Sports | 14 |
| Access roads and other items | 3 |
| Total | <u>$33\frac{1}{2}$</u> |

THE FOLLOWING IMPORTANT POINTS SHOULD BE NOTED WITH REGARD TO THE ABOVE FIGURES FOR PRIMARY AND SECONDARY SCHOOLS IN TOWNS:

(a) These are the *minimum* amounts of flat, level, suitably shaped land which such schools should have. If some parts of the land are of little use owing to their shape, or for other reasons, extra land is desirable to make up for the poor parts.

(b) If the population in a given part of a town is likely to increase in the future, additional land should be reserved for schools.

(c) If it is not possible to give as much land as is recommended, the schools can be built on much less.

It will not, however, be possible to provide as many sports and games and other outdoor activities for the children as is desirable.

§ 5. LAND FOR SCHOOLS IN COUNTRY AREAS

A rough and ready way of working out a reasonable amount of flat, level land for ordinary schools in the country where land is not so hard to come by as in towns is as follows:

Primary day schools

Standards I to IV: 1 acre per class.

Standards V, VI, VII and VIII: 2 acres per class.

Secondary day schools

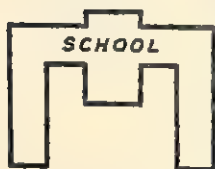
3 acres per class.

More land is desirable, if it can be obtained, especially for secondary schools. We must not forget that not only is the number of people likely to increase but that, as time goes on, children tend to stay at school for longer and longer periods before leaving and earning a living.

Boarding schools

Boarding schools need much more land than day schools.

ROAD



SCHOOL

PRINCIPAL'S
HOUSE

TENNIS
COURTS

PHYSICAL
EDUCATION

NB

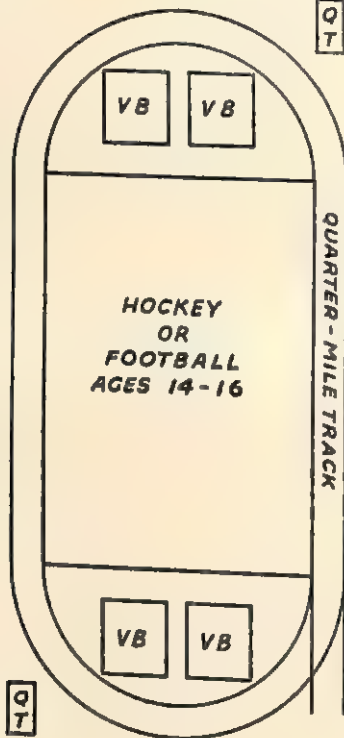
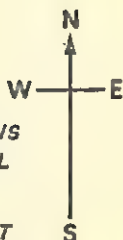
NB

ROAD

NB NETBALL
QT QUOIT TENNIS
VB VOLLEY BALL

SCALE.
1 INCH : 150 FEET

ROAD



HOCKEY
OR
FOOTBALL
AGES 14-16

VB

VB

QUARTER-MILE TRACK

HOCKEY
OR
FOOTBALL
AGES 12-14

FOOTBALL
AGES 14-16

QT

QT

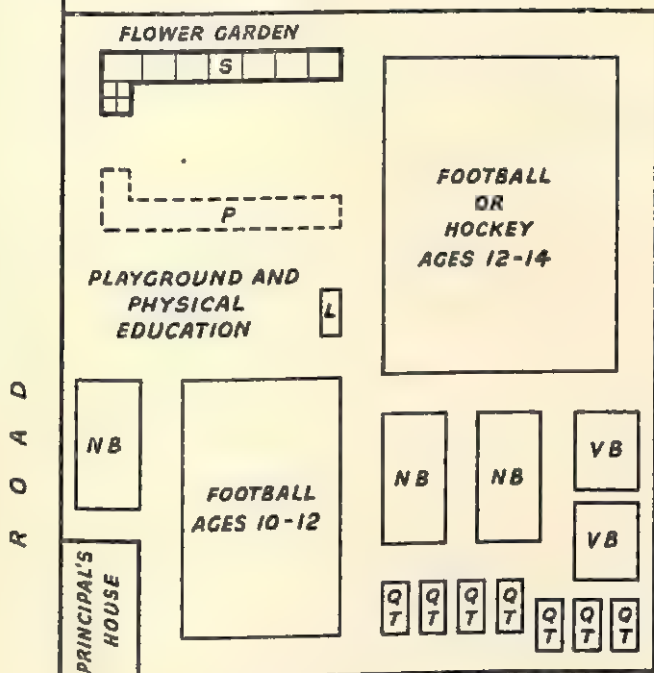
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QT

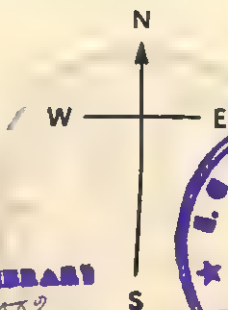
QT

The diagram on this page shows a well laid out primary school on about $5\frac{1}{2}$ acres. That on the facing page shows a well laid out day secondary school on about 9 acres.

SCALE. 1 INCH : 150 FEET.



- S SCHOOL AND OFFICES
- P PROVISION FOR FUTURE EXTENSION
- L LAVATORIES
- NB NETBALL
- VB VOLLEY BALL
- QT QUOIT TENNIS



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§ 6. THE SETTING ASIDE OF THE LAND

It is very important that the right of the school to use the land should be *legally recorded and registered with the land authority*.

If this is not done the time may come when private people may claim all or part of the land as their own together with the buildings on it, or plough up a portion of it for growing crops, or graze their cows or sheep or goats on it. There have been cases of these very things.

Verbal agreements are not enough. Those who make them may forget the details, or change their minds, or die.

The land should be *carefully surveyed and accurate plans made to scale*. Contour lines should be shown on the plan, showing how much the land slopes and where, so that it is easier to plan where the buildings and playing fields should go. The points of the compass should be shown on the plan, so that it can be seen where the sun rises and sets. The scale of the plan must be shown.

Marking the land

The land should be completely surrounded by a hedge or fence, or both, partly to show exactly where the boundaries are and partly to keep out animals or people who are not wanted on the land.

If a hedge is planted it should consist of plants which live a long time and do not spread. Kei apple plants do well in some parts of the world and make an excellent thorny hedge.

§ 7. THE SITING OF THE BUILDINGS

The school buildings should be so placed in the school grounds as to use up as little of the level land best suited for playing fields as possible. Hence they should usually be in a corner or to one side of the grounds. Many schools have been spoilt by putting the buildings in the middle of the only land suitable for playing pitches when it is quite unnecessary to do so.

Where there is a shortage of land, it may be best to use double storey buildings. When these are built, special care must be taken to ensure that there are enough stairways for the children to be able to leave the upper storey very quickly should the building catch fire.

The path of the sun in the sky

In hot countries, it is usually best for the long sides of classrooms to run from East to West, so that the sun does not shine through the windows either in the morning or the afternoon. Then the classrooms are not only cooler but no curtains are needed. Curtains are expensive and keep the air from flowing freely.

Keeping the buildings together

It is best for the buildings to be grouped closely together rather than scattered about. If this is done less land is used up and the cost of putting in electric light or piped water is less. Also there is less chance of getting wet in rainy weather when moving from one building to another.

Public services

In towns, it is desirable for the buildings to be near the water, electric light and telephone mains, so as to reduce the cost of the connections.

It is desirable for the buildings to be near a road so that the cost of making roads to the main buildings inside the grounds is reduced. On the other hand, classrooms should not be too near much-used roads as the noise of the traffic may interfere with the teaching. Dust from dusty roads may also be a nuisance.

Prevailing winds

When planning the buildings thought should be given to the directions from which the wind and rain usually come.

It is best for latrines and kitchens to be down-wind from the main buildings.

It is a good thing for the buildings to be upwind from the playing fields so that dust from them is not blown into the rooms.

It is often best for any verandahs to be on the rainy sides of buildings.

The layout of the buildings should include arrangements for rain-water to be carried away from them, especially in areas where there are heavy rains.

In many countries, the placing of tanks to store water has to be borne in mind.

Pit latrines should be sited well away from any wells for fear of spoiling the water. The advice of health experts should be sought in this matter.

Room for future extensions

It is very important when planning the positions of buildings to leave room for extensions and new buildings in the future. It is nearly always necessary to add to school buildings as time goes on and more and more children go to school. This is especially true in countries where the demand for education is increasing very rapidly.

§ 8. PLANNING THE WHOLE LAY-OUT OF THE SCHOOL

The best method of planning the lay-out of a school is as follows:

(a) Make an accurate large-scale drawing of the land available, showing portions of the land next to the school land, and the road of access. It is best to use squared paper.

(b) Show the scale to which the drawing is made.

(c) Show the points of the compass on the drawing.

(d) Mark accurately on the drawing, preferably by means of contour lines, all steeply sloping land which cannot be used for either games pitches or buildings.

(e) Mark carefully any rocky or badly broken land.

(f) Cut out of cardboard accurate ground-plan drawings of the buildings there will be both at present and in about twenty years' time. Also cut

out of cardboard drawings of all the games pitches that will be required now and in the future. *These cardboard cut-out drawings must be to the same scale as the drawing of the land.*

(g) Move the pieces of cardboard about on the drawing of the school plot until the best arrangement of buildings and games pitches is found. Then outline them on the drawing in their correct positions and sizes, using dotted lines for buildings which will not be built for a fair number of years. Last of all, put in the roads and paths which the people in the school will use.

Some hints for the planner

When planning the lay-out of the buildings and playing fields, the following points should be borne in mind:

(a) The longer sides of playing pitches should lie from north to south so that the sun never gets into the players' eyes when facing either goal.

(b) There should be plenty of space between the playing fields so that there is room for spectators and so that when the ball goes outside, it does not interfere too much with the players on other pitches. Much more space is needed round some kinds of pitches than round others. For example, football and hockey pitches need much more space round them than netball or volleyball pitches. There should be at least thirty feet between football or hockey pitches and preferably much more.

(c) When planning football pitches leave room for corner kickers to take their run.

(d) Try to arrange for a quarter mile running track, ten to fifteen yards wide. A football pitch or hockey pitch may be fitted inside it.

(e) Try to arrange for any cricket pitches to lie between football or hockey pitches so that they can be kept in good condition when not in use.

(f) Try to arrange for jumping pits, shot putting pitches and the like to be outside hockey and football pitches so that they do not spoil them, and can be used at any time.

(g) If possible, there should be a place for physical training which is not on one of the games pitches.

(h) If possible, there should be an open space near the main classroom block which can be used for large assemblies of people, for example on prize-giving days.

(i) Shade trees, flowers and shrubs, however desirable, should not be planted on land needed for games pitches.

(j) You should be prepared to cut down trees if they interfere with the best lay-out. *But for every tree cut down, several should be planted in more suitable places.*

(k) If there is ample land, some thought may be given to providing a car park. There may be very few people in the area with cars at present, but in the future there may be many.

If there is ample land, it is a good idea to plan the whole lay-out of the school including the needs of the future, on the land itself, putting in the surrounding boundaries last of all.

§ 9. SIZES OF GAMES PITCHES

The following sizes will be found useful when laying out playing fields.

| <i>Game</i> | <i>For ages</i> | <i>Size in feet</i> | <i>Number of players</i> |
|---|-----------------|---------------------|--------------------------|
| Football: | under 12 | 195 × 120 | 22 |
| | 12 to 14 | 240 × 180 | 22 |
| | 14 to 16 | 300 × 210 | 22 |
| | over 16 | 330 × 210 | 22 |
| Hockey: | under 16 | 255 × 165 | 22 |
| | over 16 | 300 × 180 | 22 |
| Rugby: | under 16 | 450 × 150 | 30 |
| | over 16 | 480 × 210 | 30 |
| Netball: | | 100 × 50 | 14 |
| Basketball: | | 85 × 46 | 10 |
| Quoit tennis: | | 40 × 18 | 2 or 4 |
| Rounders: | | 200 × 120 | 18 |
| Volleyball: | | 60 × 30 | 18 or more |
| Tennis: | | 78 × 36 | 2 or 4 |
| Badminton: | | 44 × 20 | 2 or 4 |
| 440 yards athletic track: about 580 × 310 | | | |

(A football pitch 330 × 210 goes conveniently inside such a track.)

Spaces between fields should be at least as follows and preferably much more:

| | |
|------------------------|--------|
| Football and hockey | 30 ft. |
| Netball and volleyball | 15 ft. |
| Quoit tennis | 10 ft. |

The figures above will be found useful in working out how many pitches a school of a given size should have. *It should be possible for 40 per cent of the*

children to play games on any day of the week, so a school of 240 children should have sufficient pitches for 40 per cent of 240, which is 96, to play at the same time.

In a school with plenty of land this could be arranged as follows:

| | <i>Children</i> |
|-----------------------|-----------------|
| 2 Football pitches | 44 |
| 3 Netball courts | 42 |
| 5 Quoit tennis courts | 10 |
| | — |
| | 96 |

In a school with very little land, the arrangement could be as follows:

| | <i>Children</i> |
|---------------------|-----------------|
| 3 Netball courts | 42 |
| 3 Volleyball courts | 54 |
| | — |
| | 96 |

PART II

SCHOOL BUILDINGS

§ 10. WORKING OUT WHAT IS NEEDED

When someone wishes to build a school, he should ask himself the following questions:

Is the school to be a day school, or a boarding school, or a mixture of the two?

Will the school be for boys, or girls, or both?

Up to what standard will the school go?

How many children must be provided for (*a*) at once, (*b*) in the future?

How many classrooms will be needed?

How big should the classrooms be?

What other kinds of rooms should there be?

How many of each kind will be needed, and what sizes should they be?

How many rooms are essential, and how many, though desirable, can be done without?

How should the rooms be grouped?

Will any staff quarters be needed? If so, how many? And how big should they be?

What additional buildings may be required in the years to come?

§ 11. BUILDINGS FOR DIFFERENT SIZES OF SCHOOLS

The number of rooms a school needs besides classrooms varies with the size of the school and the kind of school. The bigger the school, the more it needs special rooms.

A four class day primary school for the first four years of education could manage with the following accommodation:

- One classroom for each teacher.

- One office for the Principal.

- One general store.

- Sufficient lavatories for staff and children. (See the section called 'Sanitation'.)

- A suitable place for washing. (See the section called 'Ablutions'.)

- A covered area where the school can meet for morning assembly and other functions.

A much bigger school might need extra kinds of accommodation as follows:

- A book store.

- A small store for gardening and cleaning tools.

- A staff room.

- An office for a clerk.

A school which takes children up to their seventh or eighth year of schooling might need extra accommodation such as the following:

- A handicrafts room or workshop.

A domestic science room for teaching cooking and laundry work.

A bicycle shed.

A secondary school might need the following extra rooms:

Science laboratories.

A geography room.

A library.

A boarding school would need the following extra accommodation:

Dormitories.

A kitchen.

A dining-room.

Recreation rooms.

§ 12. SOME IMPORTANT POINTS ABOUT BUILDINGS

The sizes of various kinds of school rooms given in sections 13, 14 and 16 will be found very useful when planning school buildings. *They should be regarded as minimums; namely, the smallest suitable sizes.* If somewhat bigger rooms can be built, so much the better.

It is important to note that the sizes of rooms given are the sizes INSIDE the walls. So when working out the overall sizes of buildings, the thicknesses of the walls must be added.

Remember when planning rooms such as dining rooms, school halls, staffrooms, washrooms and latrines, that in years to come the number of children at the school may increase. So they should be made bigger than the minimum size if possible, or planned so that their sizes can be increased later.

There must be enough doorways to enable the children to leave the buildings very quickly in case of fire or other emergency, and every outside door should open *outwards*.

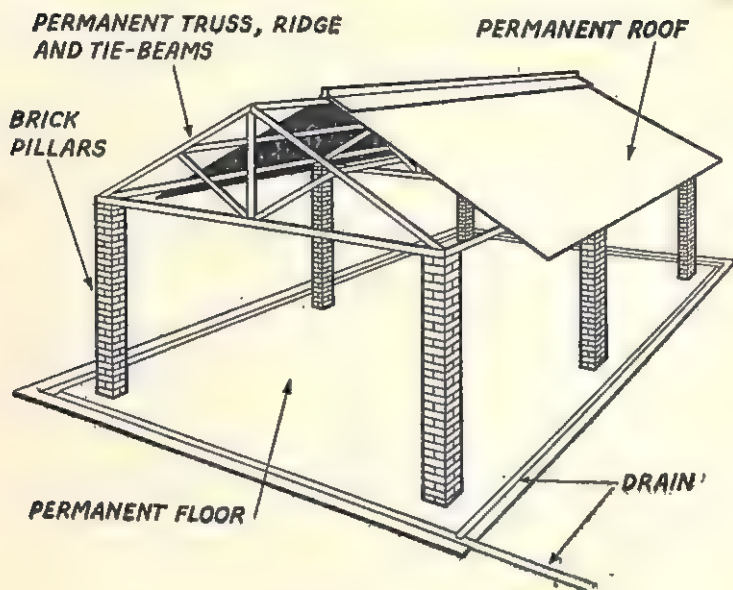
In buildings of more than one storey there should be *two stairways* from each upper storey to the ground. It is best for these stairways to be at opposite ends of the building.

Every corridor and stairway should be well lighted and ventilated and should be not less than four feet wide. Wider stairways and corridors than this are desirable in many cases. Stairways and ramps should be provided with handrails.

Permanent buildings

Provided the school buildings are of a sensible size, not too small, it is best to build in permanent materials, materials which will last at least fifty years without needing replacements or major repairs. This is particularly true of towns. Indeed in many towns there are by-laws which forbid the erection of any new buildings unless they are of permanent materials, with concrete, stone or good burnt brick walls and roofs of such materials as concrete, tiles or corrugated iron, aluminium or asbestos.

Permanent roofs on permanent pillars



If the community cannot afford permanent buildings, it should try to find enough money to pay for *permanent roofs supported on permanent pillars*. For it is the roofs of temporary buildings which give the most trouble, constantly needing repair. The walls can then be built of temporary materials such as sun-dried bricks, mud and wattle, locally sawn timber, split poles, bamboo and so on, and be replaced later on when there is more money.

Permanent pillars may be made of brick, concrete or steel.

In countries in which insects destroy wood it is

often best to use metal trusses and purlins for the roof.

After putting up a permanent roof on permanent pillars, *the next most important thing to have is a permanent floor.* In the tropics, a cement floor usually gives the best value for money.

The next most important thing is *a permanent store.*

In the tropics, it is often not necessary to have windows and doors to classrooms. Half walls are often sufficient.

Expanded metal or bars may be used on the leeward or dry side of the buildings instead of windows.

If the buildings run longways from east to west, so that the sun never shines directly into the windows, and the roof has a good overhang, it may be possible in some areas to do without verandahs, thus saving considerable expense.

Money can often be saved by doing without ceilings.

Temporary buildings

Temporary buildings, for example mud and pole buildings with thatched roofs, are much cheaper to build than permanent buildings, and much easier and quicker to put up. Their great drawback is that they need constant attention to keep them in order—attention which is expensive if paid for, and hard to get if the responsibility rests on the community. Too often they wear out quickly, and then stay that way, because nobody will repair them.

§ 13. SIZES OF CLASSROOMS

The best size and shape for a classroom depend upon the following main factors:

- (a) the number of children one teacher can teach effectively.
- (b) the number of single or two-seater desks which can be placed in the room at suitable distances from one another and from the blackboard.
- (c) the cost of building.
- (d) the need for all the children to get a good view of the blackboard in front.
- (e) the need for the teacher to be able to see all the children at once.
- (f) the need for the teacher's voice to be heard clearly by all.
- (g) the need for the teacher to be able to get to each child's side.

A good standard size for an ordinary classroom, whether for a primary school or a secondary school is 19 ft. 6 in. \times 25 ft. or, in round numbers, 20 ft. \times 25 ft.

Such a room, about 500 sq. ft. in size is just big enough for *thirty children in single seater desks*, or *forty children in two-seater desks*.

It is not desirable to have more than thirty children in a class, or at most forty. *When there are too many children in a class the teacher cannot manage them properly and their education suffers.*

Bigger classrooms than 20 ft. \times 25 ft. for ordinary work are very pleasant, but of course they are more expensive.

It is usually unwise to make classrooms smaller

than 19 ft. 6 in. \times 25 ft. even if there are too few children to fill them at present, because there will probably be more children in ten, twenty, thirty or forty years' time.

It must be remembered that a strongly built classroom made of brick or stone may well last more than a hundred years. There are thousands and thousands of classrooms in the world today which are too small because their builders did not look far enough ahead.

It is important for the children's health and general well-being that classrooms should not be overcrowded.

Some countries have laws which limit the number of children who are allowed to use a classroom. In Kenya, for example, two of the Education (Health and Safety) Regulations, 1958, read as follows:

(a) *No room used as a classroom shall accommodate in single seat desks a greater number of pupils than the number produced by the following calculation:*

$$\frac{\text{area of room in square feet} - 140}{11.3}$$

(b) *No room used as a classroom shall accommodate in double seat desks a greater number of pupils than the number produced by the following calculation:*

$$\frac{\text{area of room in square feet} - 140}{8.5}$$

In Uganda the Public Health (School Building) Rules lay down somewhat different requirements. The Rules demand $12\frac{1}{2}$ sq. ft. of floor space for each pupil plus 50 sq. ft. for the teacher. For children under 12, 10 sq. ft. for each pupil is considered sufficient.

§ 14. CLASSROOMS FOR SPECIAL PURPOSES

For certain special purposes, it is desirable to have bigger classrooms than the normal 20 ft. \times 25 ft. size. Examples are:

- (a) Kindergarten classrooms. These are often used for Standard I and Standard II.
- (b) Woodwork or handicrafts rooms.
- (c) Domestic science rooms.
- (d) Science laboratories in secondary schools.
- (e) Specialist rooms in secondary schools, e.g. geography rooms, art rooms, etc.

“Kindergarten” classrooms

It is desirable to have more space in the first year of formal schooling, that is in Standard I, than in the higher classes of the primary school. The reason is that it is less natural for small children of six or seven years of age to sit at desks than older children. Their lessons should include group work and other activities which require them to move about more and use more space than the children in the upper classes.

Classrooms for the first year may be as big as 20 ft. \times 32 ft. Many schools use large classrooms like this for the second year (Standard II) as well.

The woodwork room

The workshop has to be bigger than an ordinary classroom because the benches in it take up so much more room than desks, and there has to be plenty of space between the benches as well so that the boys can move freely at their work.

A good way to work out the size of the woodwork shop is to allow 70 sq. ft. per bench for two boys. Then for 16 boys, 560 sq. ft. will be required. This is greater than the size of a standard classroom which is some 500 sq. ft. in area.

It is recommended that the woodwork shop should be not less than 22 ft. wide, to allow for two rows of benches.

It is usual to build woodwork shops which take only half the number of boys in an ordinary class at one time. There are two reasons for this. One is that for 30 boys a very large and costly room would be necessary, more than four times the size of an ordinary classroom. The second is that it would be very difficult for the instructor to teach effectively with so many boys in so big a room.

The following additions to the actual workshop are desirable:

- (a) Instructor's room and tool store, about 180 sq. ft.
- (b) Timber store, about 180 sq. ft.
- (c) Store for articles in making, about 180 sq. ft.
- (d) A store for finished articles.

Where funds are short, a woodwork room 22 ft. \times 50 ft. in size will be found satisfactory with a store 8 ft. 6 in. \times 22 ft. added at one end.

The domestic science room

As with woodwork, it is usual to teach only half a normal class at once in a domestic science room and for the same reasons.

22 ft. \times 40 ft. will be found a satisfactory size for

simple general purposes with a store 8 ft. 6 in. \times 22 ft. added at one end. The measurements given are, as always in this little book, *inside* measurements.

§ 15. GENERAL INFORMATION ABOUT CLASSROOMS

Here are some important points:

1. There should be at least 7 ft. 6 in. between the front desks and the blackboard, otherwise those at the sides cannot see the board as well as they should.

2. The children should face down the length of the room so that they can see the board better and so that the teacher can see them better.

3. Every classroom should have windows or window spaces. The window area should total at least one-fifth (20 per cent) of the floor area so as to admit plenty of light.

4. If the windows are glazed, not less than three-quarters of their area must be able to open so as to admit plenty of air. Children cannot learn well in stuffy rooms.

5. If shutters are used instead of glass windows, they must all be able to open completely.

6. All windows should provide unobstructed daylight. It is bad for the children's eyes if there is not enough light.

7. There should be no windows on end walls, especially the blackboard end. Light from directly in front strains the eyes. If the light comes directly from behind, the children's bodies keep some of it from the books in front of them.

8. Not less than half the window area should be on the pupils' left.

9. Light should be as even through the classroom as possible.

10. If any of the windows face a nearby road, they should be high enough to prevent the children, when seated, from seeing the passers-by. Otherwise, their attention may be drawn away from the lesson.

11. The inside walls should be light in colour so that there is a better light in the room.

12. It is a good thing to have softboard on the walls so that pictures and diagrams can be fastened to them. In some schools the windows are built fairly high on one side of the classroom so as to give more space for display boarding.

13. The inside walls of classrooms should be *at least* 8 ft. 6 in. high in temperate climates and 9 ft. 6 in. high in hot climates. If the classroom has a ceiling and the minimum height is used, additional ventilation should be provided by raising a centre panel in the ceiling 3 ft. 6 in. wide to allow side vents at least 6 in. high throughout the length of the classroom.

A ceiling height of 10 feet is commonly used in temperate climates and 10 ft. 6 in. or 11 ft. in hot climates, no ventilation in the ceiling itself being provided.

14. It is often unnecessary to have ceilings, provided the roof is of a material such as thatch which prevents the sun's heat from getting through.

15. A classroom should have a ceiling if it is to be used for night work, so as to improve the light. The ceiling should be white.

16. It should not be possible for the children,

while sitting down, to be able to see into any other classroom, as this may distract them from their work.

17. The walls between classrooms should be soundproof and should go right up to the roof or ceiling as the case may be, so as to prevent sounds from going from one classroom to the next.

§ 16. ROOMS OTHER THAN CLASSROOMS

Offices

The size of the Principal's office should be 120 sq. ft. or more, depending on the size of the school.

For one clerk: 120 sq. ft. will do.

For two clerks: 150 sq. ft. will do, if they work in the same room.

Staff common rooms

Staff rooms should be big enough to provide at least 20 sq. ft. per teacher. If it is planned to extend the school at some future date, *the staff room should be made big enough at the beginning to provide for all the teachers there are likely to be in the future.* A staff room will usually be at least 120 sq. ft. in area.

Many small schools do not provide staff rooms unless there are at least four teachers.

Store rooms

Stores are needed for the following:

- (a) Stationery and textbooks.
- (b) Physical education and games equipment.
- (c) Tools for use in the grounds.
- (d) Cleaning tools, such as buckets, brushes, brooms, etc.
- (e) Broken desks, etc. awaiting repair.

The kinds and sizes of stores vary with the size of a school. In a very small school, a single store will do for everything, but in a fourteen class school, for example, as many as five stores may be needed.

A seven classroom school would need stores as follows:

One stationery and book store: 120 sq. ft.

One general store: 80 sq. ft.

One store for gardening and cleaning tools:
40 sq. ft.

Most schools are short of storage space and if more space can be given than the areas given above, so much the better.

School hall

6 sq. ft. per pupil is a reasonable amount. To this should be added a space some 15 ft. in depth for a platform 11 ft. deep and a space between it and the pupils of 4 ft. The ceiling height should be in accordance with the size of the hall, and is usually at least 12 ft.

If a school has no hall, it is very useful to have a covered area providing standing room for assem-

blies. For these, at least 4 sq. ft. per pupil should be allowed.

Dispensary

If a dispensary is provided, it should be at least 10 ft. \times 12 ft. in size.

These are very necessary in some schools.

Bicycle sheds

The usual arrangement is for the bicycles to be side by side, in two long rows, facing one another, with their front wheels fitting into a rack of some kind.

A good width for a bicycle shed is 10 ft. To get the length allow 2 ft. 8 in. (32 in.) for every 2 bicycles. Thus a shed 10 ft. \times 16 ft. in size will take 12 bicycles. A shed 10 ft. \times 24 ft. will take 18 bicycles, and a shed 10 ft. \times 32 ft. will take 24 bicycles.

It is best for bicycle sheds to be well away from main roads as this reduces the risk of theft.

Dormitories

The floor area should be big enough to give an average of *at least 40 sq. ft. per pupil*. 48 sq. ft. per pupil is a figure often used.

It is usual to have 20 to 30 children in each dormitory.

The beds should be some 6 ft. long, and be placed 3 ft. apart and 1 ft. 6 in. from end walls. It is usual to have two rows of beds with a corridor between, so a dormitory should be at least 15 ft. wide inside. A width of 18 ft. is often used.

It will be seen from these figures that the *minimum*

size for a dormitory for 30 children would be 15 ft. \times 80 ft.

The window area of the dormitory should be *not less* than one-tenth of the floor area.

Not less than three-quarters of the window area must be able to open.

There should be vents in the walls so arranged as to ensure a *permanent passage of air through the dormitory*. The vents must be at least 6 ft. above floor level and lead directly to the open air. The area of the vents should not be less than 81 sq. in. for every 600 cu. ft. of room space.

Common rooms for boarders

At least 4 sq. ft. multiplied by the total number of boarders on the roll should be allowed. It is desirable that any common room should have space enough in it for at least one table-tennis game, for which an area of 27 ft. \times 15 ft. is needed. The table itself is 9 ft. \times 5 ft. in size.

Dining-rooms

There should be 9 sq. ft. per pupil.

If the dining-room is used as a hall, 8 sq. ft. per pupil may be allowed plus a platform 11 ft. deep across the front of the hall plus a strip 3 ft. deep between the front row of benches and the edge of the platform.

Kitchens

There should be provision for such things as the following:

- (a) A suitable space for the stoves.

- (b) Food stores for meat, vegetables and other foods. A separate store for dry goods such as grain, sugar, etc. should be provided if possible.
- (c) Store for kitchen utensils.
- (d) Scullery with plate and cup storage.
- (e) A place to prepare vegetables.
- (f) A changing-room for kitchen staff is desirable with washing facilities and clothes hooks.
- (g) A pot wash.
- (h) A service-room adjoining the dining-room is desirable.
- (i) A store for firewood or other fuel.

There should be a roadway in the school whereby vehicles bringing food or fuel come close up to the stores, so as to reduce the amount of carrying.

§ 17. SANITATION

Ideas vary from one country to another, and from one part of a country to another about the provision of latrines and urinals. In towns, for instance, higher standards may be demanded than in the country. Then again, some people have different ideas from others about whether there should be separate provision for the two sexes, or for different races, or for different ages and so forth.

Each community should find out from its own government or local government health authority what is required.

The standards given below were laid down for Kenya in 1958 by the Director of Education after careful consultation with the Director of Medical Services.

While many schools in many countries, including Kenya, do not yet have these standards in all schools, they give a clear picture of what the ultimate goal should be.

A smaller proportion of fittings for either boys or girls should only be allowed if permitted by the area's health and education authorities.

Sanitation in a day school

There should be well lighted and well ventilated closets or other fittings as follows:

| | |
|-------------------------------|-----------------------------------|
| for the first 30 girls | 4 closets |
| for the next 270 girls | 1 extra closet for every 30 girls |
| for every 50 additional girls | 1 closet |
| for the first 30 boys | 4 fittings |
| for the next 270 boys | 1 fitting to every 30 boys |
| for every 50 additional boys | 1 fitting |

At least one-third of the fittings for boys should be closets, the rest being urinals. There should be at least two closets. Where the urinal is a trough, two feet of the trough should be counted as one fitting.

There should be separate sections for boys and girls with separate screened approaches.

Sanitation in a boarding school

There should be well lighted, well ventilated closets as follows:

for every 50 girls 7 closets

for every 50 boys 5 closets and 2 urinals (two feet of
trough counts as one urinal)

Sanitation for the staff

Closets should be provided for each sex of each race at the rate of 1 closet to 12 persons.

Pit latrines

Pit latrines should not be less than 20 ft. deep. House flies do not usually breed at this depth.

They should be provided with well-fitting covers.

Fly-proofing should be provided whenever possible.

Pit latrines should be sited at least 50 yards from any well water supply, and preferably further, as directed by the health authorities.

They should be *not less* than 100 ft. from living quarters and 150 ft. from kitchens and dining-rooms, and should be down-wind if possible.

It is very important that latrines should be kept very clean and pit covers replaced immediately after the latrine is used, so as to prevent the spread of disease. Strict rules should be made and the latrines should be inspected daily to see that the rules are kept.

§ 18. ABLUTIONS

The standards given below are quite out of the question for many schools at present, owing to lack of water or the high cost of supplying running water, basins and other fittings. They show what should be aimed at, however, and will be found useful for schools which do have clean running water or hope to install it in the future.

As with sanitation, ideas about washing vary in different countries. In some areas, for example, it is felt that boys and girls, or different races, should have separate washing places, while in others, it is felt that this is not a matter of great importance. As with sanitation, each community should find out *from its own health authority* what rules to follow, and then follow them very carefully.

The rules laid down in Kenya in 1958 are as follows:

Wash-basins

In every school wash-basins shall be provided in the following numbers:

(a) *In a day school*

For the first 120 pupils, 1 basin for every 30 pupils. For every *additional* 50 pupils, 1 basin.

(b) *In a boarding school*

For every 5 pupils, 1 basin.

(c) *For the staff*

No rule is laid down, but 1 basin for each 12 members of staff is considered desirable.

Showers and baths

In every boarding school there shall be provided showers *or* baths to the number of 7 *for every* 50 *pupils*, with a minimum of 2.

In some parts it is considered that the numbers of showers or baths should be increased *in secondary boarding schools* to 4 baths and 6 showers for every 50 pupils.

In very hot damp areas it is desirable to have some showers in day schools for the use of the pupils after physical education lessons.

Footbaths

In some areas where the children go barefoot, it is considered desirable to have footbaths in day schools.

| | |
|---------------------------------|------------|
| For the first 100 pupils | 1 footbath |
| For every additional 150 pupils | 1 footbath |

Clothes washing slabs

Where the pupils wash their clothes on concrete slabs, 15 ft. of slab, 2 ft. wide, for every 40 pupils will be found to be a sound enough standard.

Fractions

People sometimes ask what they should do if their calculations show that they should have, say, $1\frac{1}{2}$ handbasins or 7.28 showers. The answer is that the fraction, or the figure after the decimal point always counts as an extra basin, or shower, or footbath, as the case may be.

§ 19. DRINKING WATER

Where practicable, a water supply *certified as wholesome by the Medical Officer of Health* should be provided.

Where drinking fountains can be installed there should be 1 to 50 for the first 100 pupils, and 1 to 100 for additional pupils.

NOTE. Where water certified as wholesome comes through 'mains', the drinking fountains should be connected directly to the mains, and not to storage tanks, as it is much easier for the water in storage tanks to become polluted.

PART III

SCHOOL FURNITURE

§ 20. CLASSROOM FURNITURE

Every classroom should have:

- (a) A blackboard. The blackboard should be at least 4 ft. \times 3 ft. in size and preferably much longer. The lower edge should be about 4 ft. from the floor. Cement blackboards on end walls are very good. The colour may be either black or dark green, and should be matt, not glossy.

There should be a grooved shelf at the bottom of the board for chalk. Blackboards should be marked with thin permanent horizontal lines to help the teacher to write neatly.

- (b) A desk or table for the teacher.
- (c) A chair for the teacher.
- (d) A large cupboard with a good lock. Built-in cupboards, of concrete, brick or stone, may be found best, especially where classrooms have half walls and it is easy for thieves to get in.
- (e) A cupboard for the class library if this is too big to go in the teacher's cupboard.
- (f) A notice board.
- (g) Softboards fixed to the walls for pictures, etc.
- (h) A seat and ample desk space for every child.
- (i) A large waste-paper basket.

§ 21. SCHOOL DESKS

It is important that there should be ample desk space for each child.

The desk should be the right size and shape. If it is too big or too small, or if the seat is too far back, permanent harm may be done to the child's body. In addition his ability to learn may be reduced.

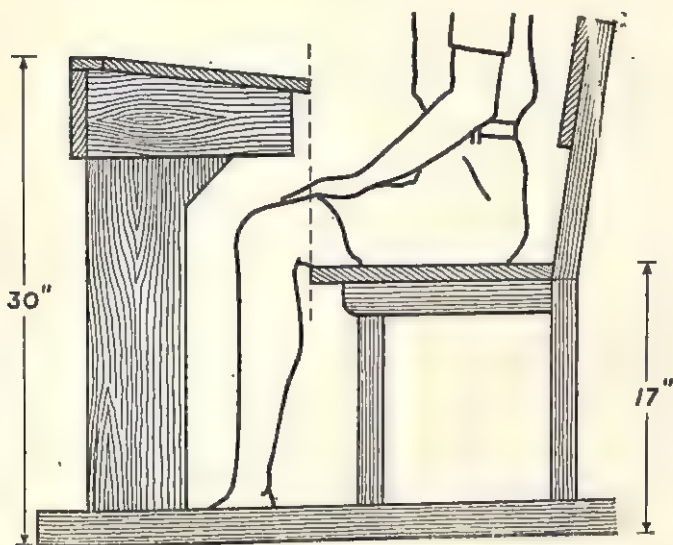
Single desks with separate chairs, or single seater desks are the best. The standard classroom, 20 ft. \times 25 ft. in size is designed for 30 of these. If more than 30 have to be put in a classroom, for example 40, room can be made by grouping the single desks in pairs. Two-seater desks are the next best. A two-seater desk costs less than two single seaters and takes up less room. The disadvantages of two-seater desks are that they lend themselves to cheating and lack of self-reliance, and to the spread of contagious diseases and verminous conditions.

Three- or four-seater desks are unsatisfactory for the following reasons:

- (a) If the seat is at the proper distance from the desk, a child in the middle cannot stand up easily.
- (b) The teacher cannot get close enough to the middle child to give him individual attention, and he cannot easily look at the child's work the right way up.
- (c) They cannot easily be moved and are therefore not suitable for group work in the lower classes. (This is another argument in favour of providing cement floors in schools.)

Some important points

As the child spends from two to five hours a day sitting, *a support for the back is essential*, whatever type of desk is used. The support should go up as high as the shoulder blades.



When the child is sitting, the thighs should be horizontal and the lower part of the leg vertical, with the feet resting on the floor. *The seat should take two-thirds of the child's thigh.* There must be sufficient space for the thighs between the chair seat and the bottom of the book compartment.

The height from the seat to the writing surface of the desk should be such that the child can, when writing, sit upright in an easy position. That is, the

writing surface should be at elbow height or a little higher. The child should be able to write without raising the shoulders.

The relationship of the front of the seat to the rear edge of the writing surface is important. The front edge of the seat should be nearly vertically below the rear edge of the writing surface.

The depth of the desk top (that is, from front to back) *should be at least 12 in.*

The width of the desk top (that is, from side to side) *should be from 20 in. to 24 in. for each child.*

For the lower classes in the primary school, where apparatus and materials have to be used frequently on the desk, a flat-topped desk has advantages. In many schools, small tables and chairs are used.

In the higher classes, where the children have to sit for longer periods, the sloping desk has advantages in that it is more comfortable and ensures better posture. A slope of 10 degrees is sufficient.

It is advisable to have a groove along the front of the desk to hold pens and pencils, and inkwell holes are desirable. The inkwell holes should be to the right of each child's writing surface. A few desks in each classroom should have inkwell holes on both the left and the right, so that they can be used for left-handed children.

Desks should provide storage for books.

It is important that desks should be strongly made so that they cannot sway about while the children are in them, and so that they do not break easily. If there are termites in the area special care needs to be taken of desks in the holidays.

Suitable desk sizes

The following average figures will probably be found quite suitable for different age groups and will be found useful when ordering new desks. In the actual classroom, of course, each child should be given a desk which fits him, regardless of his age. In a class in which the children vary considerably in size there should be corresponding differences in the desk sizes.

| <i>Age</i> | <i>Seat height from floor (inches)</i> | <i>Height of writing surface (inches)</i> | <i>Width of desk per child (inches)</i> |
|------------|--|---|---|
| 7 to 9 | 13 | 22 | 20 |
| 10 to 12 | 14 | 24 | 22 |
| 13 to 15 | 16 | 26 | 24 |

The desk given to a child should not, of course, be according to his age but according to his size.

Chairs and desks of different sizes should be marked in some way—with a splash of coloured paint, for example—so that they can be sorted out easily.

§ 22. DORMITORY FURNITURE

There should be a separate bed for each pupil. Sharing of beds is not desirable.

A good size for beds is 6 ft. long by 2 ft. 3 in.

The beds should be raised above the ground, so that it is easy to clean beneath them.

There should be ample walking space round the sides and foot of each bed.

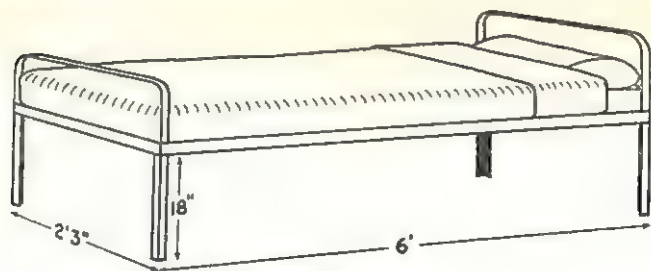
Every child should have a bedside locker in which to keep his things.

Every child should be provided with a wardrobe or a space on the wall where coats or dresses can be hung.

There should also be a place for every child to hang his towel.

Every dormitory should have an outside clothes-line where washing can be hung out to dry. It is a good idea to have some arrangement for drying clothes inside the dormitory as well, for use when it is raining or at night when washing left outside to dry may be stolen.

Mosquito nets are desirable in areas where there is the danger of malaria.



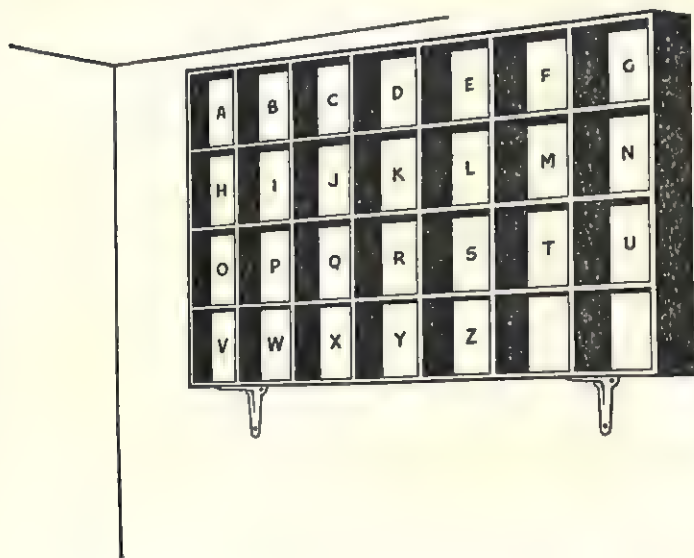
§ 23. STAFF-ROOM FURNITURE

There should be a chair and ample table space for each teacher.

There should also be ample shelving or cupboard space in which exercise books, textbooks, etc., can be kept. If each teacher can have his own locker, so much the better.

A bookcase for the Staff Library is desirable. It should be lockable.

In the larger schools it is a good thing to have a cabinet with a pigeon-hole for each member of staff into which letters and messages can be put.



§ 24. SCHOOL HALL FURNITURE

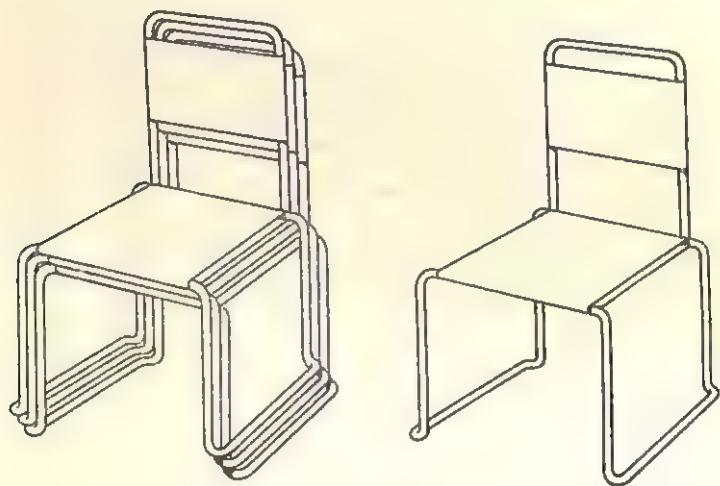
As it is often necessary to clear the floor in a hall, the seats should be easy to move and easy to stack.

Benches are cheap and useful. Their disadvantage is their lack of back-rests. This is, however, much less important in a hall than in a classroom.

A good type of chair is the type which can be stacked one above the other like a stack of spoons.

The folding type is seldom strong enough to stand up to school wear and tear for years and years without damage.

Ordinary school chairs are satisfactory but the fact that they cannot be stacked quickly and easily into a small space is sometimes a great disadvantage.

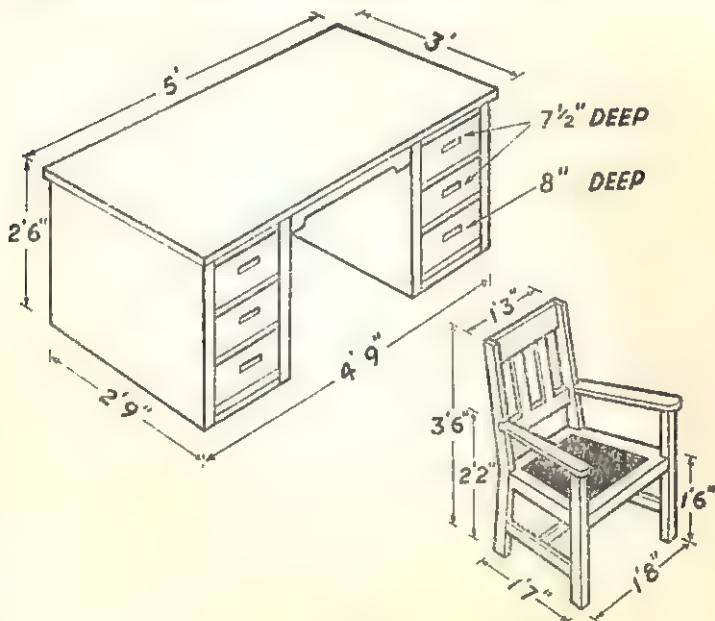


§ 25. OFFICE FURNITURE

The Principal should have the following main items:

- (a) A desk with six drawers.
- (b) An office chair with arms.
- (c) Four office chairs for visitors.
- (d) Cupboard.
- (e) Filing cabinet.
- (f) Safe.
- (g) Waste-paper basket.

If the school has no clerk the Principal should also have a simple duplicating apparatus.



§ 26. SOME STANDARD SIZES OF FURNITURE

| | <i>Surface</i> (<i>inches</i>) | <i>Height</i> (<i>inches</i>) | <i>Seat or chair</i> <i>height</i> (<i>inches</i>) |
|-------------------------|-------------------------------------|------------------------------------|--|
| Dual kindergarten table | 40 × 18 | 20 | 12 |
| | 40 × 19 | 22 | 13 |
| Dual desks | 40 × 13 | 22 | 13 |
| | 42 × 13 | 24 | 14 |
| | 44 × 13 | 26 | 15 |
| | 45 × 14 | 28 | 16 |
| | 46 × 14 | 30 | 17 |
| Single desks | 20 × 13 | 22 | 13 |
| | 21 × 13 | 24 | 14 |
| | 22 × 13 | 26 | 15 |
| | 23 × 14 | 28 | 16 |
| | 24 × 14 | 30 | 17 |
| Classroom tables | 24 × 18 | 30 | 17 or 18 |

Stationery cupboard: 6 ft. × 3 ft. × 18 in. with three fixed and three movable shelves.

Classroom cupboard: 6 ft. × 3 ft. × 18 in. with three shelves.

Teacher's table: 5 ft. × 3 ft. × 30 in. high. Two locking drawers.

Headmaster's pedestal desk: 5 ft. × 3 ft. × 30 in. high. Six drawers $7\frac{1}{2}$ in. to 8 in. deep.

Office chair with arms: seat height 18 in.; seat area 15 in. × 15 in.

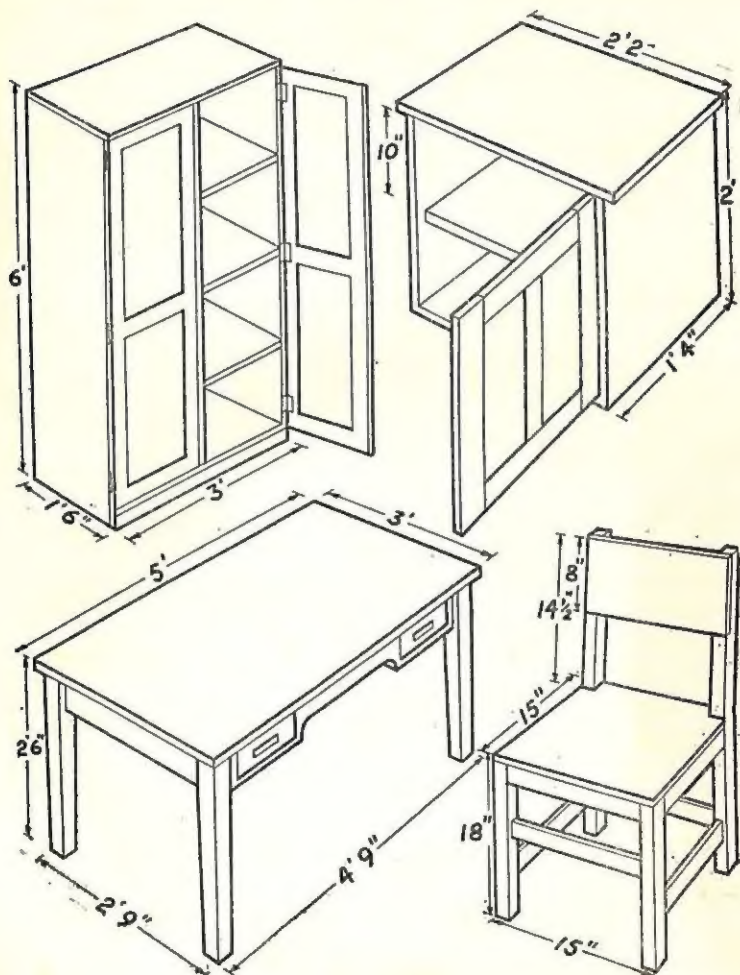
Office chair without arms: seat height 18 in.; seat area 15 in. × 15 in.

Bookshelf: 3 ft. 3 in. wide; 3 ft. high; 4 shelves 8 in. from front to back.

Bench: 9 ft. × 1 ft. × 18 in. high.

Bedside locker: 2 ft. 2 in. \times 1 ft. 4 in. \times 2 ft. high. One shelf 10 in. from the top.

Bed: 6 ft. \times 2 ft. 3 in. \times 18 in. high.







Staff Library

TEACHING LIVELY ENGLISH

EXAMINATION TIME

THE ENGLISH SYSTEM OF EDUCATION

BOARDING SCHOOLS

SCHOOL DISCIPLINE

LEARNING TO READ

GOOD HANDWRITING

TEACHING NATURE STUDY

WILLINGLY TO SCHOOL

SCHOOL BUILDINGS,

FURNITURE AND PLAYING FIELDS

TEACHING HISTORY

ON THE THRESHOLD

THE ART AND CRAFTS TEACHER

TEACHING PRACTICE AND TESTS

KNOW YOUR PUPILS

PRIMARY SCHOOL ARITHMETIC

SCHOOL ACCOUNTS